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PROVISIONAL INTELLIGENCE REPORT

SOME ECONOMIC FACTORS AFFECTING PRODUCTION OF CAPITAL EQUIPMENT IN COMMUNIST CHINA

CIA/RR PR-144
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CENTRAL INTELLIGENCE AGENCY

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S-E-C-R-E-T

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(ORR Project 34.502)

NOTICE

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FOREWORD

This report has two objectives. Its first objective is to present the latest estimates of the production and the inventory of machine tools, textile machinery, and agricultural equipment in Communist China. Its second objective is to offer a tentative explanation of certain economic phenomena in China. Specifically, this report suggests that the types of commodities being offered for export by the Chinese Communists are in part a function of short-term domestic imbalances in production -- in terms of the relationship both between capital equipment and final products and among types of capital equipment -- and represent a short-term factor which should be added to the generally accepted list of political and propaganda factors in the discussion of Chinese Communist trade.

This report further suggests that there are also long-term factors which are operating broadly in the same direction as the short-term imbalances. It should be reasonable, for example, to expect continued emphasis on the export of certain items of capital equipment as a result of the comparative advantage which the Chinese Communists may enjoy in the production of these items.

The commodities discussed in this report constitute a small part of all capital equipment produced in Communist China. Consequently, the explanation offered can be regarded only as provisional -- to be confirmed, refuted, or modified in the course of further research.

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SOME ECONOMIC FACTORS AFFECTING PRODUCTION OF CAPITAL EQUIPMENT IN COMMUNIST CHINA*

Summary

By 1957 the gross value of industrial production in Communist China is expected to be about twice that of 1952. The large deficiencies in capital equipment which had to be overcome, the rapidity of the recovery, and the durability of capital equipment have brought temporary imbalances, or structural maladjustments, in China's economy.

The annual rate of increase in industrial production in Communist China has not been uniform, and sharp decreases in the rate of increase in 1954 and 1955 have occurred. A cessation, or even a decrease, in the rate of increase such as China has experienced results in downward adjustments in the production of numerous industries which have been developed to a level which can be maintained only if other industries, or the economy as a whole, continue to expand at a given rate. The decreases in the over-all rate of industrial production in China have had repercussions on the capital equipment industries of China as illustrated by the experiences of the machine tool, the textile machinery, and the agricultural equipment industries. Reflecting the decrease in the rate of increase, the estimated output of machine tools showed an actual decline, dropping from approximately 16,700 units in 1953 to 16,000 units in 1955. The shortage of cotton in China has necessitated a decrease in the rate of increase in the production of textiles. The decline in the production of textiles, in turn, has resulted in a decreased demand for textile machinery for purposes of expansion. In 1954 and 1955, production of textile machinery continued to increase, but at a sharply reduced rate. Substantial increases in production of agricultural equipment are estimated to have taken place during 1953 and 1954, to be followed by decreases in the rate of increase or even actual declines in production during 1955-57.

* The estimates and conclusions contained in this report represent the best judgment of ORR as of 15 May 1956.

On the other hand, these imbalances have had a favorable effect on the ability of Communist China to export capital equipment. While temporary imbalances exist, China is trying to substitute foreign demand for domestic demand for certain capital goods, especially for such goods as machine tools and textile machinery. Even when many of the difficulties resulting from an unbalanced growth disappear, however, it is expected that the ability of China to export simpler types of capital equipment will increase during 1956-57, although, in absolute terms, exports will be small.

Industrial goods are expected to become increasingly important in Communist China's schedule of exports, especially to underdeveloped countries in Asia and Africa. Paradoxically, China probably will have a comparative advantage in the field of certain industrial goods rather than in agriculture. The cost of additional increases in agricultural production probably will be very high relative to the cost of obtaining increases of equal value in the production of industrial goods. Furthermore, the underdeveloped areas generally want semifabricated and finished goods rather than primary products.

Communist China's estimated inventory of machine tools was about 150,000 units in 1955, compared with an inventory of 90,000 units for all China in 1937. By 1957 the planned inventory of spindles for China will be over 7 million units and of looms, almost 123,000 units.

The most important regions in Communist China for production of machine tools are Northeast, East, and North China. North China, with 50 percent of total production of textile machinery, and East China, with 35 percent of such production, are the most important producers of textile machinery. Northeast, East, and Central and South China are the principal producers of agricultural machinery.

I. Introduction.

The growth of industrial production in Communist China -- actual and proposed -- from 1952 through 1957 is shown in Table 1.

Table 1

Growth of Industrial Production in Communist China a/
1952-57

Year	Index of the Gross Value of Industrial Production (1952 = 100)	Percentage Increase over Previous Year
1952	100	
1953	131	31
1954	154	18
1955	162	5
1956	180	11
1957	198	10

a. For the methodology used to compile this table, see Appendix B.

During 1952 and 1953, growth generally was rapid because of the employment of previously underemployed resources such as unemployed urban workers and idle plants. After 1953, growth resulted chiefly from increased investment which incorporated basic technological changes. The machine process supplanted labor to a considerable extent, and industry grew rapidly as the new techniques permitted increased production. Although further improvements have been taking place continually, the earlier vigorous expansion has slackened, and during the latter part of the First Five Year Plan (1953-57) growth will not be so rapid if the Chinese Communists adhere to their plans. The sharp falls in the rates of increase in industrial production in 1954 and especially in 1955 will have serious repercussions on the capital equipment industries and may make the plans for expansion during 1956 and 1957 more difficult to attain. In this report are examined the effect of the retardation of growth on the capital equipment industries -- particularly,

the machine tool, textile machinery, and agricultural equipment industries -- and the possible implications for foreign trade in such retardation of growth.

II. Production.*

A. Machine Tools.

Before the Chinese Communists gained control of the Chinese mainland in 1949, the Chinese were making machine tools such as small lathes, grinders, and shapers in small establishments. These machine tools generally were made in small quantities, although in Manchuria, under the Japanese, some machine tools were made on a production-line basis. The highest countrywide output ever attained was not over 2,000 units per year. During 1953, however, important advances were made in production of machine tools, and although production included many types never before produced in China, the Chinese Communists were still making principally general-purpose, basic machine tools.** A possible explanation for the emphasis on this type of production is the lack of a need by Communist China for special-purpose machine tools. China does not have a capital equipment industry mass-producing automobiles, trucks, tractors, agricultural equipment, and similar heavy equipment which would require more complex machine tools. The basic types which are manufactured reflect the technological level and the methods of production of the industries which use them.

The Chinese Communist machine tool industry is significantly influenced by Soviet design and practice. Technological assistance from the USSR and the European Satellites is evident in the predominance of machine tools patterned after Soviet models. Many of the machine tools produced in Communist China even retain the same identification numbers as those on the Soviet prototypes. 1/*** Assistance from the European Satellites has been limited principally to deliveries of machine tools and equipment rather than of blueprints and technical personnel.

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* For geographic distribution of production, see Appendix A.

** General-purpose, basic machine tools include lathes, grinders, and shapers and are to be distinguished from special-purpose, fully automatic machine tools.

*** For serially numbered source references, see Appendix D.

Since 1953 the Chinese Communist government has exhibited its machine tools at many international trade fairs. The Leipzig Trade Fair in East Germany has been used by the Chinese Communists as a propaganda forum for their machine tools. At this fair in 1953 and 1954 the Chinese exhibited machine tools of advanced types which were unrepresentative of Communist China's present technology.* Several competent engineers even have alleged that the Chinese have attached name plates to machine tools which were originally produced elsewhere. 2/

Estimates of the output of machine tools in Communist China from 1949 through 1955 are shown in Table 2.

Table 2

Estimates of the Output of Machine Tools in Communist China a/
1949-55

Year	Units	Percentage Change over Previous Year
1949	1,589	
1950	3,321	+109
1951	5,879	+77
1952	11,202	+90
1953	16,716	+49
1954	16,365	-2.7
1955	16,000	-2.2

a. For the methodology used to compile this table, see Appendix B.

The big increase in the output of machine tools from 1949 to 1950 is attributed principally to better and more efficient use of existing facilities. Increases in output of 77 and 90 percent in 1951 and 1952, respectively, were caused by the gradual expansion of facilities as well as by the renovation and modernization of existing plant. Although there is no indication of any significant

* Photographs of the machine tools which the Chinese Communists are producing and of those which they are exhibiting are available -- the tools are not the same.

increases in plant facilities during 1953, the percentage increase in output nevertheless was fairly large and probably was a result of more experience and skill on the part of the workers and more intensive use of existing facilities. In 1954, on the other hand, because of imbalances and dislocations in the economy, there was an absolute decrease in the output of machine tools. 3/ Despite little information and the haziness of the situation in 1955, it is estimated that the sharp decrease in the rate of increase in over-all industrial output from 18 percent in 1954 to 5 percent in 1955 may have resulted in an absolute decrease in the output of machine tools during 1955.

The Chinese Communists state in their First Five Year Plan that the output of machine tools by 1957 -- the end of the Plan -- will be 12,720 units and that these units generally will be heavier and more complex. In terms of weight, output will be 80 percent higher than in 1952. 4/ By 1960, as a result of the construction or expansion of 4 machine tool plants, an annual output of 30,000 machine tools is expected to be achieved. 5/ Because machine tools are basic instruments of production and because progress in their design and manufacture leads to lower production costs, machine tools probably have a high priority in Communist China's program for industrialization.

B. Textile Machinery.

Although China has had a textile industry for almost 70 years, the Chinese Communists claim that up to the end of 1949 the Chinese textile mills were supplied with imported machinery and that no textile machinery had been produced in the country. 6/* By 1955, Communist China asserted that textile machinery no longer had to be imported and in April 1955 agreed to export to Burma complete sets of machinery for spinning and weaving mills. In

* According to a report published by the South Manchurian Railway, 7/ during the Japanese occupation 30 looms and 10 machine tools had been produced in what is now the Tsingtao Textile Machinery Plant, known before the Japanese surrender as the Nitto Ironworks. In 1940 and 1941 this plant produced textile machinery parts. Furthermore, a CIA report 8/ lists several plants which produced, or at least seem to have produced, textile machinery and parts. It is possible that the Chinese Communist claims are true and that the plants mentioned here may have merely assembled the machines.

addition, Burma has requested that China send technicians to assist in the installation of equipment and the training of personnel. 9/ In 1955, China also made textile machinery available to Egypt. If China actually can export and fulfill its needs simultaneously, such a change would imply a spectacular rate of progress. (See III, below.)

Shown in Table 3 are the progress in the output of textile machinery in Communist China in terms of spindles* and power looms from 1951 through 1954; an estimate of output in 1955; and projections of output through 1957, which is the last year of China's First Five Year Plan. There is no evidence that there was any significant production of textile machinery before 1951, and the big relative increases, both actual and projected, through the end of 1957 can be attributed to a very small base at the start of the expansion program.

Table 3

Estimates of the Output of Textile Machinery in Communist China a/
1951-57

Year	Spindles (Units)	Percentage Change over Previous Year	Power Looms (Units)	Percentage Change over Previous Year
1951	64,000		4,000	
1952	250,000	+288	6,000	+50
1953	286,000	+14	8,500	+42
1954	325,000	+14	13,000	+53
1955	425,000	+31	14,820	+14
1956	575,000	+35	15,709	+6
1957	675,000	+17	16,337	+4

a. For the methodology used to compile this table, see Appendix B.

* The term spindle, when used to denote spinning capacity, refers not only to a steel rod on which a bobbin is placed but also to the whole complement of spinning machinery. The problem, then, is whether a spindle in Communist China includes all the machines which constitute a spindle in the US and the UK. For example, the spinning process in the UK includes throwing machines and doubling machines, which increase the quality of the thread or yarn and

The output of both spindles and looms in 1951 was produced in existing machinery plants converted to the manufacture of textile machinery. 10/ In 1951 the Chinese Communists had just begun production of complete sets of textile machinery and were not yet operating at full capacity. The big increase in output from 1951 to 1952 occurred because of the repair, re-equipment, and more efficient use of existing facilities.

The increase in the output of spindles from 1952 to 1953 was moderate and was a result of more experience on the part of the workers, more intensive use of plant and equipment, and a small amount of production by the new Ching-wei Textile Machinery Plant in North China at the end of 1953. The 14-percent and 31-percent increases in the output of spindles in 1954 and 1955, respectively, were a result of the production issuing from the Ching-wei plant on a 1-shift basis. This large plant will gradually work up to a 3-shift basis in 1957 and to an output of about 400,000 spindles.* When the base is small initially, the addition of one more plant can make a large relative contribution to total production.

The big increase in the output of looms in 1954 was a result of the modernization and enlargement of existing plants, such as the China Textile Machinery Plant in Shanghai; the better organization of production through the consolidation of small plants; and the more intensive use of plant and equipment. It is expected that output will increase in 1955, 1956, and 1957 by 14, 6, and 4 percent, respectively. Increases of this size will be sufficient to build up Communist China's planned loom inventory.

C. Agricultural Equipment.

Communist China does not possess an agricultural equipment industry in the sense that the term is used in the US. Much agricultural production in China is carried on by primitive methods.

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which might well be omitted in the spinning process in China. It is not known whether a spindle in China is the same as in other countries.

* It is assumed that both domestic and foreign demand will warrant such a large output. Such an assumption may not necessarily be realistic.

Although animal-drawn (horse or oxen) equipment is in increasingly greater use, the hoe, scythe, and rake are still the most important equipment used in Chinese Communist agriculture.

Estimates of the output of the new-type (animal-drawn) and of the old-type (hand-tool) agricultural equipment* in Communist China from 1952 to 1957 are shown in Table 4.

Table 4

Estimates of the Output of Agricultural Equipment in Communist China a/
1952-57

Year	New Type (Thousand Units)	Percentage Change over Previous Year	Old Type (Thousand Units)	Percentage Change over Previous Year
1952	300 b/			
1953	343 c/	+14.3	71,000 d/	
1954	429 e/	+25	120,000 f/	+69
1955	1,200 g/	+180	150,000	+25
1956	1,300 g/	+8.3	130,000	-15.3
1957	1,400 g/	+7.7	110,000	-18.2

a. For the methodology used to compile this table, see Appendix B.
b. 11/
c. 12/. This figure includes a reported output of 150,000 to 200,000 plows and harrows, mostly the former.
d. 13/
e. 14/. This figure includes a planned output of 250,000 to 300,000 plows and harrows, mostly the former. It is assumed that the plan was fulfilled.
f. 15/
g. This figure includes a planned output of 1- and 2-bottom animal-drawn plows. 16/ Planned output of animal-drawn equipment during 1955-57 amounts to 1.5 million to 1.8 million units. 17/

* Press and radio coverage of production of agricultural equipment in Communist China regularly uses such terms as tools or implements to cover everything from scythes to animal-drawn plows. These terms occasionally are broken down into "new-type" and "old-type" implements. The former category is believed to include larger items such

Until about the end of 1952, agricultural equipment in Communist China was produced in plants which existed at the time the Communists assumed control and which subsequently were reconstructed. Beginning in early 1953, however, a program of new plant construction was initiated, and a number of existing plants were enlarged. Construction activities reached their height in 1954. Press and radio reports indicate that at least 25, and possibly as many as 50, plants were involved in the construction program, which included China's largest agricultural equipment plant in Peiping. 18/ Although most of these plants were rather small, they were important in the aggregate. Moreover, agricultural equipment was added to the production schedules of plants which ordinarily produced other commodities, but these plants made only a minor contribution to total production.

Increases in Chinese Communist production of agricultural equipment from 1952 to 1953 and from 1953 to 1954 were relatively modest and were realized while the construction program was still under way. The big planned increase in 1955 was a result of the expected completion of the new plants. Reports on production for 1955 indicate that the planned levels of production probably were attained. 19/ Production plans through 1957 indicate that further construction on the 1953-54 scale is not expected.

The estimated decreases after 1955 in production of old-type equipment merely reflect the decreasing need for such items as more new-type equipment becomes available. The many blacksmith shops and handicraft producers cooperatives which now produce at least one-half of the old-type equipment probably will produce spare parts for the new-type equipment and will devote increased attention to production of small consumer items, such as pots and pans.

In expanding production of agricultural equipment as rapidly as possible, Communist China has duplicated Soviet and European Satellite models, particularly the former. China's complete line of animal- and tractor-drawn equipment is composed of

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as plows, seed drills, harrows, cultivators, reapers, and threshers. The latter category includes the remainder of production, such as scythes, hoes, rakes, and the like, and probably also includes plows with wooden rather than steel shares. In this report, the term equipment has been used to include both tools and implements.

duplicated models. A major step forward in China's agricultural equipment program was the beginning of production of the first Soviet-type tractor-drawn grain combine in December 1954 at the North China Agricultural Equipment Plant in Peiping. 20/ Although this plant is the only agricultural equipment plant now capable of producing a piece of equipment as complicated as a tractor-drawn grain combine, the fact that this plant is now in production is an indication of the long-range goals which are being set up for the agricultural equipment industry in China. Soviet technical advisers in China have contributed immeasurably to the speed with which China has realized the advantages of duplicating Soviet equipment.

D. Retardation of Growth.

The production of textile machinery and new-type agricultural equipment is advancing at diverse rates, as is shown in Table 5. The machine tool industry, however, suffered an absolute

Table 5

Comparison of Indexes of Industrial Output in Communist China a/
1952-57

Year	Industrial Sector	Machine Tools	Textile Machinery		New-Type Agricultural Equipment
			Spindles	Looms	
1952	100	100	100	100	100
1953	131	149	114	142	114
1954	154	128	130	217	143
1955 b/	162	134	170	247	400
1956 b/	180		230	262	433
1957 b/	198		270	272	467

a. For the methodology used to compile this table, see Appendix B.
b. Planned.

decline in output in 1954. Because of the sharp decrease in the rate of increase in over-all industrial production in 1955 compared with that in 1954, another absolute decline in output of machine

tools in 1955 is likely. Moreover, even in those industries in which production is increasing, growth seems to be neither uniform nor unretarded. Because of the decrease in the rate of increase in various industries, questions arise as to (1) what are, and have been, the forces of growth and development in those industries and (2) what are the processes which cause either a retardation in their rate of growth or an absolute decline in output.

During 1952 or 1953, progress generally was rapid because of the employment of previously underemployed resources such as unemployed urban workers and idle plants. After 1953, advances were made chiefly because of increased investment which incorporated basic technological changes.* In this period the machine process supplanted labor to a considerable extent, and industry grew rapidly as the new techniques permitted increased production for most commodities. Although further improvements are taking place continually, vigorous expansion has slackened. Consequently, toward the latter part of the First Five Year Plan, growth will not be so rapid as in the earlier years of the Plan.

Production in an industry consists of a series of separate operations that lead in an invariable sequence from the raw material to the finished product. Once the methods of production of one important operation are changed by the addition of modern machinery, pressure is exercised upon the other operations to become more efficient. Any disparity in performance in the different stages of production will limit the exploitation of the original innovation, thus resulting in an imbalance in the economy.

New industries and new techniques require the development of a more efficient labor force, the improvement of which is an important element in technological progress. In Communist China, teaching formerly unskilled workers the operations and maintenance of expensive and complicated machinery has been a difficult and slow task and has limited the rate of technological progress.**

* The output per worker is a good indication of trends in technological changes. The Chinese Communists have been emphasizing increases in the productivity of industrial workers.

** "The low technical level of workers has contributed greatly to the breakdown of machinery. Many new machines and much equipment of various plants and mines have been wrecked by inexperienced workers, particularly youths who lacked technical or scientific background." 21/

Because most industries are interconnected, the slow growth of one industry can eventually exercise a check upon the growth of the others. If the industries supplying the raw materials grow slowly, the growth of manufacturing industries, which are more favored by the benefits of technological development, will be retarded. The rate of increase in textile production in Communist China, for example, has been exceeding that in cotton production, resulting in the curtailment of plans for the enlargement of the textile industry. 22/ It is a peculiarity of capital goods,* fixed and movable, that, because the demand for them is derived and because they have a relatively long life, a decrease in the rate of increase in the production of final goods* tends to cause an absolute decrease in production of capital goods intended for current output. Retardation in the rate of increase in the production of textiles, for example, tends to cause an absolute decrease in net investment in capital goods for the textile industry.

The aggregate requirement for capital goods, however, will not necessarily decrease. Because the Chinese Communists are undoubtedly working with some very old equipment, replacement** of obsolete equipment at a higher than normal rate could usefully occur when the rate of expansion of capacity decreases. The rate of replacement will depend upon the expectations of the administrators. For example, if the cotton shortage is expected to last for some time, real investment may well decrease, and a considerable volume of replacement will be postponed. In addition, there probably will be some excess capacity for capital goods production. An attempt on the part of the Chinese to export textile machinery, in small quantities at first, should therefore not be unexpected or surprising. The most likely initial result in an importing country like Communist China, however, probably will be a curtailment of imports, thus releasing foreign exchange for other purposes. The Chinese, in fact, already have announced that they no longer need to import textile machinery.

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* The terms final goods and capital goods are not used in any absolute sense but are relative to each stage of production. What is final goods at one stage of production may be capital goods for another product at another stage.

** Frequently it is difficult to distinguish between expansion investment and replacement. A substantial amount of net investment takes the form of replacing existing machines with better or larger ones.

Similarly, a retardation in the rate of increase in production of the industrial sector of an economy as a whole tends to be magnified into a diminished absolute demand for machine tools which are the basic instruments of production. This diminished absolute demand for machine tools may be revealed (1) by an absolute decrease in the production of machine tools, (2) by an increase in the rate of replacement of obsolete equipment, (3) by a decline in the volume of imports of machine tools, (4) by an ability to export machine tools, and/or (5) by excess capacity for the production of certain types of machine tools. In addition to experiencing an absolute decrease in the output of machine tools in 1954 compared with 1953, the Chinese Communists already have begun exporting machine tools in small quantities and apparently want to increase exports in the future. There is some inconclusive evidence that imports of machine tools have diminished, but there is little information on China's replacement policy.

In any economy, relationships among and within the forces of production, distribution, and consumption are constantly changing, and these changes, in turn, are exaggerated or mitigated by the responses to these changes. There are usually lags between the original changes and the subsequent responses to these changes. During these lags, imbalances in the relationships of the various sectors of the economy toward the economy as a whole and toward each other scarcely can be avoided. The lags may be divided into the following three categories 23/:

1. The lag between the need for action and the recognition of that need.

2. The lag between the recognition of the need for action and the taking of action.

3. The lag between the taking of action and the effects of the action.

In an economy where there is some degree of price flexibility, where prices react to changes in the forces of supply and demand, and where prices perform their allocative function, imbalances are quickly noticed. The first lag can be avoided to an appreciable extent. Lags 2 and 3 are present in any economy, although there is

a better chance of avoiding them in an unplanned economy. In Communist China, however, with its policy of maintaining an almost rigid price system, there is no way to determine whether an industry is being overbuilt or whether an important commodity is being overproduced relative to the needs of the rest of the economy until the situation becomes serious. In China these imbalances have resulted in a piling up of inventories and unemployed resources in some parts of the economy. 24/ An indirect result of the piling up of inventories and unemployed resources has been an increase in the capital-output ratio, although it is impossible to give numerical precision to this increase. The economy is getting less out of its capital than it might get -- a situation which the Chinese Communists can ill afford.

There is evidence that in Communist China's economy considerable overproduction and excess capacity exist in many lines, including some kinds of machinery. The Chinese Communist government itself admits that overproduction in 1953 and 1954 has been its most critical production problem. 25/

On the other hand, the situation in the production of agricultural equipment in Communist China is different. The rate of increase of agricultural production has decreased, but the principle of derived demand cannot be used to explain changes in the production or accumulation of agricultural equipment. In industry, machines are added to obtain more production, but in agriculture -- especially in China, where the land is intensively worked -- additional machinery probably will not raise the yield per acre. Machines merely replace human beings even in those areas where there is no scarcity of labor only because such replacement seems fashionable. The "demonstration effect"* is strong in underdeveloped countries, and China is not an exception.

* The term demonstration effect was applied originally to the hypothesis that consumption functions of different countries are interrelated in the same way as individual consumption functions. 26/ Knowledge of, or contact with, new consumption patterns widens the horizon of imagination and desires, encouraging imitation. This hypothesis is illustrated by the seemingly overwhelming desire of many underdeveloped areas to imitate US production methods as well as US consumption habits. In the cases of Pakistan and Burma, for example, it can be said that US production methods have been too closely imitated. Highly mechanized equipment, suited to conditions in the US, where labor is relatively scarce, but not suited to

A retardation in the growth of industry in general, and of textiles in particular, affects the production of both textile machinery and machine tools. A decline in the rate of growth of the textile machinery and the machine tool industries causes an absolute decline in the need for capital goods with which to produce textile machinery and machine tools. Furthermore, the diminishing rate of growth in the production of agricultural equipment implied in Communist China's plans will also be a contributory factor in decreasing the demand for machine tools within China, at least temporarily -- that is, until the imbalances among various industries are mitigated. It is to be expected that the Chinese Communist authorities will attempt to avert a decrease in domestic production and the resulting unused capacity by an attempt to export, by a curtailment of imports, or perhaps by embarking on an ambitious replacement program.

III. Foreign Trade.

The Chinese Communists have insisted that they do not have to import textile machinery, but there is evidence that they are still importing textile machinery in small quantities.* Furthermore, given Chinese domestic production and a desire to increase the inventory of spindles and looms as planned,** the need for imports or the ability to export will depend upon the rate of replacement. Column (4) of Table 6*** and Column (4) of Table 7**** show the quantity of imports needed -- the deficits -- if the Chinese are to build up the productive capacity of their textile industry, or the surplus available for export if production were greater than the needs for replacement and planned expansion. During 1956-57, spindles may easily be exported if a less ambitious policy of replacement is adopted. Exports of looms, however, are more likely because of greater potential surpluses. It is evident that Communist China

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conditions in countries where labor is plentiful, has been employed by Pakistan and Burma.

* The Chinese Communists may be importing types of machinery which they do not produce, or they may be importing machinery which was ordered 2 or 3 years ago.

** The inventory figures given in IV, below, include the cut made by the Chinese Communists in their inventory plans.

*** Table 6 follows on p. 17.

**** Table 7 follows on p. 18.

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Table 6

Availability of Spindles for Export by Communist China
1951-57

Year	(1) Estimated Net Addition to Inventory of Spindles a/ (Zero Retirement)	(2) Estimated Number of Spindles Needed to Increase Inventory, Assuming a 5-Percent Retirement Rate a/	(3) Estimated Domestic Production	(4) Deficit (-) or Surplus (+) b/
1951	162,000	423,000	64,500	-97,500 to -358,500
1952	270,000	540,000	250,000	-20,000 to -290,000
1953	221,000	504,000	286,000	+65,000 to -218,000
1954	529,000	823,000	325,000	-204,000 to -498,000
1955	471,000	792,000	425,000	-46,000 to -367,000
1956	250,000	594,000	575,000	+325,000 to -19,000
1957	179,000	536,000	675,000	+496,000 to +139,000

a. These figures are derived from Table 9, p. 24, below.
b. Depending upon replacement policy.

Table 7

Availability of Looms for Export by Communist China
1951-57

Year	(1) Estimated Net Addition to Inventory of Looms a/ (Zero Retirement)	(2) Estimated Number of Looms Needed to Increase Inventory, Assuming a 5-Percent Retirement Rate a/	(3) Estimated Domestic Production	(4) Deficit (-) or Surplus (+) b/
1951	6,300	5,460	4,000	+2,000 to -1,460
1952	4,500	8,060	6,000	+1,500 to -2,060
1953	6,300	10,000	8,500	+2,200 to -1,500
1954	15,000	19,200	13,000	-2,100 to -6,200
1955	13,500	18,400	15,730	+2,230 to -2,670
1956	7,100	12,600	17,460	+10,360 to +4,860
1957	5,100	4,000	18,500	+13,400 to +7,500

a. These figures are derived from Table 9, p. 24, below.
b. Depending upon replacement policy.

will be in a position to offer textile machinery in small quantities beginning in 1956,* with the possibility of greater offerings in subsequent years, if planned objectives are attained.

The underdeveloped countries generally prefer semifabricated and finished goods rather than primary products. Consequently, the trade agreements with Burma, India, and Egypt include the stipulation that Communist China will export textile machinery and machine tools. China's current ability to export machine tools and even textile machinery, a commodity which reportedly was not manufactured in China 6 years ago, probably will have a strong, favorable effect on other underdeveloped countries of Asia and perhaps Africa. China has shown that a totalitarian government can, if it wishes, achieve large and rapid gains in the industrial production of an underdeveloped country. Such a government is in a

* Because the annual additions to the inventory of spindles and looms are subject to error, a better idea of Communist China's ability to export textile machinery can be gained by comparing the estimated domestic output of textile machinery in 1953 and 1954 with the report of Li Fu-ch'un, the Vice Premier of Communist China. 27/ Li Fu-ch'un stated that 700,000 spindles were added to the national capacity during the first and second years of the First Five Year Plan. Domestic output was about 611,000 spindles; hence there was a deficit, probably supplied by imports, of about 89,000 spindles.

If the objectives of the First Five Year Plan are met, by the end of the Plan period there will have been an increase in inventory of 1,650 million spindles and 47,100 new looms over 1952. 28/ Total domestic output during 1953-57 will have been 2,286 million spindles and 73,190 looms. Thus approximately 636,000 spindles and 26,090 looms would be available for export or replacement.

Because the need for spindles and looms has been decreasing and the production of textile machinery has been increasing, two general observations may be made: (1) During the early years of the First Five Year Plan, domestic production was needed for expansion; during the later years a great amount will be available for export. (2) Domestic production was too small to permit substantial replacement in the early years; in the later years, more machinery can be replaced. It is possible to conclude, then, that Chinese Communist claims of self-sufficiency in textile machinery appear to be increasingly justified.

better position to change the character of an economy* than a relatively democratic government, which finds it difficult to impose on the population the necessary restrictions on consumption. The prestige gained by the Chinese Communists may well compensate for any possible economic losses which might result from exporting commodities which could be employed more usefully at home.

There are several reasons for Communist China's desire to export textile machinery and machine tools. There is considerable prestige to be gained if the Chinese Communists eventually force out of the South Asian markets a good part of US, UK, and Japanese industrial products, particularly those industrial products which do not have a high degree of capital intensity.

Moreover, forces on both demand and supply act as stimuli to exports. Supply has already been discussed.** It was pointed out that a retardation of growth in the production of textiles and in industrial production as a whole has a tendency to cause, at least temporarily, an absolute decrease in the domestic demand for textile machinery and machine tools for purposes of expansion. This decrease in domestic demand for expansionary purposes may be reflected solely by a decrease in imports. Because imports of machinery, however, now probably consist largely of those types which are not produced in Communist China, a decrease in the demand*** for machinery more probably will result in underemployed resources in the textile machinery and machine tool industries in China rather than in a decrease in imports of machinery, unless foreign demand for Chinese machinery can be substituted for domestic demand.**** The efforts of the Chinese Communists, therefore, are directed at the inclusion of textile machinery and, to a certain extent, machine tools in their trade with the underdeveloped areas of Southeast Asia.

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* The character of the economy, for example, may be changed from a predominantly agricultural economy to one in which the industrial and services sectors make larger contributions to total national production.

** See Section II, above.

*** A decrease in demand does not mean that the forces of growth and development have exhausted themselves. Growth generally is not continuous but proceeds unevenly. It should also be understood that the decrease in demand is not general but "structural," centering in certain industries only.

**** Replacement also must occur at a more rapid rate.

Another factor also influences the Chinese Communist desire to export textile machinery and machine tools. The Chinese are having serious difficulties in expanding agricultural production. The already large population is increasing at a faster rate than food production, and pressure on the food supply is great and will become even greater. The costs of increasing agricultural production probably will be greater than the costs involved in increasing industrial production. Thus Communist China will have a comparative advantage in industry rather than in agriculture. This comparative advantage will impel China to export industrial goods and import food and other agricultural commodities.* This hypothesis does not mean that China will not be importing any industrial goods or will not export any agricultural commodities but merely implies that, in general, China will be importing land-intensive commodities and will be exporting labor-intensive and more or less capital-intensive commodities.

There are certain strategic advantages to this course of action. Textile machinery and machine tool plants, as well as agricultural equipment plants, can easily be converted to the manufacture of war materiel. Textile machinery and other machinery plants are equipped chiefly with general-purpose machine tools, capable of producing many types of metal products. This capability is confirmed by experience during World War II when both Soviet Bloc and US machinery plants were converted to war production. Items produced in the USSR included ammunition, small arms, mortars, and components for other military end items. US plants were converted to the production of machine tools, ammunition components, artillery pieces, magnetos, steam engines, rifles, and other items. Through international trade the Chinese Communists can avoid the great costs of maintaining a large industrial plant designed solely for the manufacture of war materiel because textile machinery exports can be cut off at any time and the plants converted to the production of military end items. It is therefore logical that China should try to attain a position in which it can export relatively simple textile machinery, machine tools, and other similar items if it should desire to do so.

* For a predominantly agricultural country like Communist China to have a comparative advantage in the field of industrial goods may sound paradoxical. The explanation, however, lies in the marginal concept. Given the present highly intensive use of agricultural land, the costs of additional increments of agricultural production are likely to be very high relative to the cost of obtaining increments of equal value in industrial production.

Demand factors also contribute to the export of manufactured goods rather than of primary products by Communist China. Many Southeast Asian countries are food-surplus areas and are eager to import manufactured goods. Moreover, as real income in the underdeveloped areas increases as a result of diversification of industries and the realization of developmental plans, there will be an increased demand for industrial goods. The demand for industrial goods is much more sensitive to changes in income than is the demand for agricultural commodities.

IV. Inventory.

A. Machine Tools.

Communist China's estimated inventory of machine tools at the end of 1955 was about 150,000 units, which is to be compared with an inventory of 90,000 machine tools for all China in 1937. 29/ Types of machine tools used in China varied with the country of origin of the machine tools. Japanese control of Manchuria after 1937 led to the adoption of Japanese types in that part of China. The Chinese Nationalists, on the other hand, controlled the southern and western areas of China during the Japanese occupation of Manchuria, and the machine tools they acquired were chiefly from Germany, the US, and the UK. In 1949, when the Communists took over the government, China's stock of machine tools had decreased to approximately 60,000 units, most of which had been manufactured in Japan.

The specific number of machine tools now being imported by Communist China is not available. It is estimated that from 1950 to 1955 an average of 2,500 to 3,000 units were imported annually. The composition of imports appears to be changing in favor of the more complex, special-purpose types, which China does not manufacture.

During the first few years of the Chinese Communist regime, exports of machine tools were insignificant. Indonesia purchased a few units which were shipped to a trade fair by the Chinese, and a few units were shipped to the North Koreans during the Korean War. Recent trade agreements with Burma, India, and Egypt, however, call for shipments of machine tools, but the number to be shipped probably will not be great.

The estimated size of, and changes in, the inventory of machine tools in Communist China from 1949 to 1955 are shown in Table 8.

Table 8

Estimates of the Inventory of Machine Tools in Communist China 1949-55

Units

Year	Production	Imports	Inventory
1949			60,000
1950	3,300	3,000	66,300
1951	5,900	3,000	75,200
1952	11,200	3,000	89,400
1953	16,700	3,000	109,100
1954	16,400	3,000	128,500
1955	16,000	3,000	147,500

No provision has been made for retirements and losses of machine tools. Although there is no indication that the Chinese Communists have an official retirement policy, machine tools eventually wear out and are scrapped. The probability is that the number of retirements of machine tools during a year is small because the Chinese move machine tools from regular production lines to less precise work and repair shops. This practice does not affect the number of machine tools but does affect the productive capabilities of the stock of machine tools. In a sense, this is a type of retirement. When a machine tool is transferred to less precise work, the value of its output decreases.

B. Textile Machinery.

From 1930 to 1937 (1936 for looms) the inventory of spindles in China increased at the rate of about 4 percent per year, and the inventory of looms, at about 10 percent, as is shown in Table 9.* Because of the devastation of war, the inventory of looms in 1945 was only 60 percent of the 1937 total. From the end of World War II in 1945 to 1949, the year in which the Communists came to power in China, the inventory of spindles and looms rose at an average rate of 11 and 31 percent per year, respectively. Since 1949, however,

* Table 9 follows on p. 24.

Table 9

Estimates of the Inventory of Textile Machinery in Place in China a/
1930, 1937-41, 1945, and 1949-57

Year	Spindles (Thousand Units)	Percentage Change over Previous Year	Looms (Thousand Units)	Percentage Change over Previous Year
1930	3,905		29.6	
1937	5,042	+4	58.4	+10
1937-41	b/			
1945	3,000 c/		23.4 d/	
1949	5,144	+11	68.2	+30.6
1950	5,228	+0.5	69.2	+1
1951	5,390	+3	71.2	+3
1952	5,660	+5	75.7	+6
1953	5,881	+4	82.0	+8
1954	6,410	+9	97.1	+18
1955	6,881	+7	110.6	+14
1956	7,131	+4	117.7	+6
1957	7,310	+2.5	122.8	+4

a. For the methodology used to compile this table, see Appendix B.
b. It is estimated that almost 2 million spindles were destroyed during this period.
c. From 1937 to 1945 there was a decrease of 41 percent in the inventory of spindles.
d. From 1937 to 1945 there was a decrease of 60 percent in the inventory of looms.

increases have been moderate and are expected to remain so through the end of the First Five Year Plan. No great fluctuations in the rates of change in the inventory of textile machinery are expected in the immediate future.

Because China did not manufacture much textile machinery before the Communist regime, it acquired its inventory through imports. During the 1930's the UK and Japan contributed more than 90 percent of China's textile machinery and parts, and the other 10 percent came primarily from the US, Switzerland, and Germany. 30/ From the end of World War II in 1945 to the withdrawal of the Kuomintang Government from the Chinese mainland in 1949, China received about US $12 million worth of textile machinery from the UK and an equal amount from the US. 31/ From 1950 to 1954, at least US $25 million worth of textile machinery reached Communist China from the Western countries. 32/ More than 75 percent of this total came from Hong Kong and the UK. Of Hong Kong reexports, at least 50 percent originally were received from the UK and Japan, thus accounting for the sizable decrease over the prewar years (1930-38) of indirect exports to China from Japan. Hong Kong reexported textile machinery which originated in the US, Switzerland, West Germany, France, and Italy. These Western countries also shipped textile machinery directly to China. 33/ Because 80 percent of China's trade is with the Soviet Bloc, the quantity of textile machinery coming from East Germany and Czechoslovakia easily could be larger than that coming from the Western countries.

Production of textiles depends upon the number of textile machines in use and their productivity. Comparisons of the physical productivity of the spindles and looms in Communist China with the physical productivity of those in other countries are very difficult. The production of yarn is generally given in pounds and that of cloth in meters, thus abstracting from quality differences -- an important factor in determining the value of production and hence the productivity of the capital equipment. Chinese cotton is the short-staple variety and very dirty. 34/ The greatest portion of China's cloth production, which is for domestic consumption or for export to Southeast Asia, is low-grade cloth. China's yarn, therefore, is considerably heavier than an equal quantity of UK, US, or Japanese yarn. Similarly, it takes a great many more picks (movements of the shuttle from one side to the other) to weave high-count British broadcloth than to weave the coarser cloth produced

by the Chinese. Consequently, if the available data were used indiscriminately, it might be concluded that the Chinese equipment is more efficient -- which could be a highly erroneous conclusion.

Because the type of cloth manufactured in India probably is nearest to Chinese Communist cloth in quality, comparison of Chinese cloth with Indian cloth probably would not introduce too much error. The number of spindles needed to produce 1 metric ton of yarn and the number of looms needed to produce 1 million meters of cloth in Communist China and in India are compared in Table 10.* From this comparison it appears that China is getting more out of its spindles and looms than India. India needed 17 spindles to produce 1 metric ton of yarn in 1953, for example, whereas China needed only 8 spindles for the same output. As stated above, this comparison abstracts from quality differences. Nevertheless, the great difference in output per spindle and per loom is chiefly a result of the greater intensity of use by the Chinese, who are pushing their capital equipment to the limits of its capacity. China's textile mills are operated on a 3-shift basis; India's mills on no more than 2 shifts, and many possibly on 1 shift. The intensive use of equipment in China results in the additional cost of more frequent repairs and replacement. As a result of a shortage of cotton, however, textile mills in 1955 will be working at considerably less than full capacity, and the disparity between the physical output per spindle and per loom in India and China will decrease.

* Table 10 follows on p. 27.

Table 10

Physical Productivity of Spindles and Looms in Communist China and in India a/
1950-54

	Number of Spindles Needed to Produce 1 Metric Ton of Yarn		Number of Looms Needed to Produce 1 Million Meters of Cloth	
Year	China	India	China	India
1950	12	18	55	58
1951	11	21	45	60
1952	9	19	42	52
1953	8	17	42	46
1954	8	17	42	46

a. For the methodology used to compile this table, see Appendix B.

APPENDIX A

GEOGRAPHIC DISTRIBUTION OF PRODUCTION OF MACHINE TOOLS, TEXTILE MACHINERY, AND AGRICULTURAL EQUIPMENT IN COMMUNIST CHINA

A. Machine Tools.

Although machine tools are produced in every region of Communist China with the exception of Northwest China, the significant regions are Northeast, East, and North China. In the number of plants and in production, Northeast China, which the Japanese built into a large industrial center, is predominant. The Chinese Communists are now locating new machine tool plants in other regions, particularly North China.

It is estimated roughly that in 1954 at least 45 percent of all machine tools produced in Communist China were produced in Northeast China. The next region in importance was East China, where most of the production was concentrated in Shanghai and its vicinity. Shanghai has long been identified as an industrial-commercial center and until recently was the only significant producer of machine tools outside of Northeast China. As of 1954, approximately 30 percent of the machine tool industry was located in the Shanghai area.

Heavy industry reportedly is being expanded in North China, especially in Shansi Province. An expanded heavy industry would be in a better position to service the consumer goods and other industries which are rapidly developing in Northwest China and in Central and South China.* There are various implications in the expansion of heavy industry in North China. Although Sinkiang is nominally part of Communist China, the USSR has great influence in this region which is far from China's industrial centers. To extend and to maintain its influence in its peripheral areas, China is building an industrial complex nearer to them. In addition, such a complex is needed farther from the coast, in a region which would be less vulnerable

* According to one source, the present geographic distribution of industry in Communist China is illogical. 35/ This source implies that historical factors -- present and past location -- will have no bearing on future location.

to enemy attack in the event of hostilities. Because the production of machine tools in China is small, the completion of the projected plant in T'ai-yuan could cause a noticeable change in geographic distribution of the industry. It is therefore believed that the contribution of Northeast China to the total Chinese Communist production of machine tools will be about the same at the completion of the First Five Year Plan as in 1954 but that North China will contribute about 10 percent more, chiefly at the expense of the Shanghai area in East China.

The estimated geographic distribution of the output of machine tools in Communist China in 1954 and 1957 is shown in Table 11.

Table 11

Estimated Geographic Distribution of the Output of Machine Tools in Communist China, by Region a/
1954 and 1957

Percent

Region	1954	1957
Northeast	45	45
East	30	20
North Central and South Southwest	25	35

a. For the methodology used in compiling this table, see Appendix B.

B. Textile Machinery.

There are 5 state-operated and 2 public-private* jointly operated textile machinery plants in Communist China.

* The term public-private is applied by the Chinese Communists to those enterprises taken over by the state in which the former owners are retained as managers or technicians and share in the profits.

The state-operated plants include the following 36/:

	Region
1. Ching-wei Textile Machinery Plant	North
2. Tientsin Textile Machinery Manufacturing Plant	North
3. Tsingtao Textile Machinery Manufacturing Plant	East
4. Shanghai Textile Machinery Plant No. 2	East
5. Cheng-hsien Textile Machinery Plant	Central and South

The public-private jointly operated plants include the following 37/:

	Region
1. China Textile Machinery Plant	East
2. Liaotung Kang-ting Cheng-pu	Northeast

The relative contributions of each region to the output of spindles in Communist China in 1954 and in 1957 are shown in Table 12.

Table 12

Estimated Geographic Distribution of the Output of Spindles in Communist China, by Region a/
1954 and 1957

Percent

Region	1954	1957
Northeast	5	5
East	55	35
North	30	50
Central and South	10	10

a. For the methodology used in compiling this table, see Appendix B.

In 1957 the percentage contribution of Northeast China and Central and South China to the total Chinese Communist output of spindles probably will be about the same as in 1954. Because the Ching-wei Textile Machinery Plant, the largest in Communist China, will be in full production by the end of the First Five Year Plan, the relative contribution from North China, as in the case of the output of machine tools, probably will increase at the expense of East China.

Very little is known of the geographic distribution of the production of looms in Communist China. The Ching-wei plant produces spindles only. On the other hand, looms generally seem to be produced in multiple-products plants, either with spindles or with other types of machines. The geographic distribution of the production of looms in China is similar to that of spindles because, to a certain extent, looms and spindles are complementary.

The textile machinery industry is new in China and probably not located because of historical factors but rather because of current economic factors. Most of the new textile mills reportedly are being built in North, Northwest, and Central and South China, 38/ and the number of spindles and looms produced in Northwest China is increasing at a rate more than three times that of the national average. 39/

The most important center of the textile machinery industry, both for the production of spindles and of looms, probably will shift to the southern part of North China for the following reasons:

1. Plants in North China will be able to serve Northwest China and other areas more efficiently. Transportation charges are important, and an area such as south Shansi Province would be nearer the center of the country.

2. T'ai-yuan is already an area of supply of raw materials and an industrial center. A large machine tool plant is being erected in south Shansi Province, and machine tools are used in the production of textile machinery.

The Shanghai area, however, will not be neglected but probably will lose its relative importance.

C. Agricultural Equipment.

The production of new-type agricultural equipment in Communist China is concentrated in the following administrative regions: Northeast China (7 plants), East China (3 plants), Central and South China (3 plants), Northwest China (2 plants), and North China (1 plant). These 16 plants are listed by region and city of location in Table 13.* The largest plant is the North China Agricultural Equipment Plant in Peiping in North China. This plant produced about 23 percent of the total output of new-type equipment in 1954. Over-all plans for plant expansion and for the building of new plants have not been announced, but the trend appears to be toward the establishment of at least one plant for the production of new-type equipment in each province of China. Over one-half of the provinces already have such a plant.

The estimated geographic distribution of Communist China's output of new-type agricultural equipment in 1954 is shown in Table 14.** As producers of the larger and more complicated new-type agricultural equipment, North China and Northeast China turn out an even larger percentage of the total production on a value basis, perhaps as much as 80 percent.

No attempt has been made to make a regional breakdown of the production of old-type agricultural equipment, such as scythes, rakes, and hoes, which are manufactured throughout Communist China by blacksmith shops and handicraft producers cooperatives as well as by the producers of new-type equipment.

* Table 13 follows on p. 34.
** Table 14 follows on p. 35.

Table 13

Major Plants Producing New-Type Agricultural Equipment in Communist China
1954

Location	Region and Plant
	Northeast
Anshan	Lingshan Agricultural Equipment Plant
Chihfeng	Chihfeng Agricultural Equipment Plant
Dairen	Dairen Agricultural Equipment Plant
Harbin	Harbin Agricultural Equipment Plant
Kirin	Chia-mu-ssu Agricultural Equipment Plant
Mukden	Mukden Agricultural Equipment Plant
Tsitsihar	Heilungkiang Agricultural Equipment Plant No. 1
	North
Peiping	North China Agricultural Equipment Plant
	East
Ho-fei	Ho-fei Agricultural Equipment Plant
Shanghai	Shanghai Agricultural Chemicals and Equipment Plant
Tsinan	Shantung Agricultural Equipment Plant
	Central and South
Canton	Kwangtung Agricultural Equipment Plant
Hankow	Hupeh Agricultural Equipment Plant
Kaifeng	Kaifeng Agricultural Equipment Plant
	Northwest
Sian	Northwest Agricultural Equipment Plant
Urumchi	Sinkiang Agricultural Equipment Plant

Table 14

Estimated Geographic Distribution of the Output of New-Type Agricultural Equipment in Communist China a/
1954

Region	Percent
Northeast	40
North	25
East	15
Central and South	10
Southwest	6
Northwest	4
Inner Mongolia Autonomous Region	b/
Total	100

a. The breakdown shown is based on reports of unit output at the individual plants in 1954. The most useful report was one which gave an output at the Peiping plant in 1954 of nearly 100,000 pieces of new-type equipment, or about 23 percent of the total unit output in 1954.
b. Output in the Inner Mongolia Autonomous Region was estimated to be less than 1 percent of total output.

APPENDIX B

METHODOLOGY

A. Table 1, "Growth of Industrial Production in Communist China, 1952-57."

For the methodology and sources used in compiling Table 1, see the discussion of Table 5.*

B. Table 2, "Estimates of the Output of Machine Tools in Communist China, 1949-55."

1949: Chou En-lai reported 40/ that the output of machine tools in 1954 would be 13,513 metal-cutting machines and that this output was 8.5 times that in the base year of 1949, which gives a figure of 1,589 for output in 1949.

1950, 1951, and 1952: The following series are the revised 1953 industrial production indexes 41/ for the production of metal-cutting machines in Communist China (1949 = 100):

1949 - 100
1950 - 209
1951 - 370
1952 - 705

Communist China's First Five Year Plan 42/ gives 1952 output as 13,734 machine tools, a figure which probably includes the output of small shops and other units not included in the modern** sector of the economy. Another figure -- 11,202 units -- also comes from official sources and has been selected because this figure seems to include only the modern sector of the economy and is consequently comparable with figures for other years.

* P. 41, below.

** The term modern industry, as defined by the Chinese Communists, refers to those enterprises which employ modern production techniques and equipment (including power) in the production process. This term does not include the handicraft industry, which depends chiefly upon hand labor or simple machinery.

1953: The output of machine tools in Communist China in 1953 was 149 percent of the output in 1952. 43/

1954: One source reported that the output of machine tools in 1954 was 97.9 percent of the output in 1953, 44/ and another source reported that the output of machine tools in 1954 was lower than that in 1953. 45/

1955: It is believed that the sharp decrease in the rate of increase from 18 percent to 5 percent in the over-all output of Communist China will result in an absolute decrease in the output of machine tools in 1955.

C. Table 3, "Estimates of the Output of Textile Machinery in Communist China, 1951-57."

1. Output of Spindles.

1952: At the end of 1953 the Chinese Communists announced that the Ching-wei Textile Machinery Plant, when in full production, would be capable of producing 200,000 spindles per year per shift, 46/ a quantity equal to 80 percent of Communist China's "present" total annual output of textile machinery. 47/ If it is assumed that the term present meant 1952 output, the total output of spindles in 1952 was 250,000 units.

1951: On 1 October 1953 the Minister of the Textile Industry stated that the domestic output of spindles in Communist China in 1952 was 388.48 percent of 1951 -- an increase of 288.48 percent. Thus the output of spindles in 1951 was 64,353 units, or 64,000 units in round numbers. Output in 1951 was considerably less than in 1952 because in 1951 China inaugurated the production of complete sets of textile machinery and did not operate at full capacity.

1953: According to one report, the Chinese Communist textile machinery plants produced 600,000 spindles during 1951-53 to equip 9 new cotton mills and to expand the capacity of several dozen old cotton mills. 48/ Thus the output of 600,000 spindles during 1951-53 minus the outputs of 250,000 and 64,000 spindles in 1952 and 1951, respectively, gives an output of 286,000 spindles in 1953.

1954: The Chinese Communists have stated that the Ching-wei Textile Machinery Plant was to go into partial production in 1954 and to turn out about 50,000 spindles. 49/ Some production also may have occurred during the latter part of 1953, 50/ and between 10,000 and 11,000 units may have been produced at that time. Thus the Ching-wei plant would have produced about 39,000 more spindles in 1954 than in 1953, and Communist China's output in 1954 would have been about 325,000 spindles, in round numbers.

1955 and 1956: It is estimated that the Ching-wei Textile Machinery Plant produced 150,000 spindles in 1955 and will produce 300,000 in 1956 and that the total output of spindles in Communist China was 425,000 in 1955 and will be 575,000 in 1956. The possible margin of error in these estimates is plus 25 percent to minus 20 percent. These estimates are based on information that the Ching-wei plant may have trebled its 1954 output in 1955. 51/ S.P. Lee, the original organizer of the Ching-wei Textile Machinery Plant, stated in 1953 that it would take 4 or 5 years before this plant could produce at an annual rate of 200,000 spindles. 52/ The large estimated increases in the output of spindles in 1955, 1956, and 1957 reflect the approach of the Ching-wei plant to a state of capacity production.

1957: It is estimated that the 17-percent increase in the production of spindles from 1956 to 1957 will be a result of the Ching-wei plant's going on a 3-shift basis, which will account for about 400,000 spindles for the year. The Chinese Communists probably will use their capital equipment as intensively as possible if the demand for textile machinery warrants such activity.

2. Output of Looms.

1951-53: The output of looms in Communist China during 1951-53 was calculated from the following information:

a. During 1951-53, more than 18,500 power looms were produced by the textile machinery industry of Communist China. 53/

b. On 1 October 1953 the Minister of the Textile Industry stated that the domestic output of looms in Communist China in 1952 increased by 52.51 percent over that in 1951. 54/

c. Evaluation of Chinese Communist reports indicates that the output of new textile machines in 1953 is unlikely to have exceeded 250,000 spindles and 6,000 power looms. 55/ Although these figures are stated to be applicable to 1953, they more probably refer to 1952 over 1951 for the following reasons: (1) It has been established that the figure for spindles given with the loom figure refers to 1952 over 1951 and not to 1953. (2) If 6,000 looms were produced in 1953 and domestic output in 1952 increased by 52.51 percent over that in 1951, the total output during 1951 53 could not have reached a total of 18,500, the figure given by the Chinese Communists. To satisfy the given conditions -- that is, 18,500 looms as the total output for 1951-53 and output in 1952 as 52.51 percent greater than output in 1951 -- the stated figure of 6,000 looms would have to refer to 1952.

There are two items of information which come from important sources but which do not fit in with the other data which are available.

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a. [redacted] the output of looms in Communist China in 1953 is given as 2 percent higher than that in 1952. 56/ It is believed that the 2-percent increase in the output of looms, as stated, is too low. Acceptance of this percentage is incompatible with other official statements.

b. It has been reported that the Chinese Communist textile plan for 1951 was to increase the number of spindles by 162,000 and to produce 2,000 power looms, 57/ but this report can be disposed of quickly. If only 2,000 looms were produced in 1951 and output in 1952 was 52.5 percent higher than that in 1951, a tremendous increase in output in 1953 (about 13,500 units) would have been required to attain the total output of 18,500 looms for the 3 years. The estimate of 6,000 looms also would be out of line. The figure of 2,000 units was only a plan; it could have been either changed or overfulfilled, although the former is more probable.

In view of the Chinese Communist boasts that they no longer need to import textile machinery, their offers to export such machinery to Burma and other South Asian countries, their tremendous need for replacements, and their increasing textile production, the output of looms in Communist China probably was more than 2,000 in 1951, and the increase from 1952 to 1953 was more than 2 percent.

1954: Between 1951 and 1954, Communist China's textile machinery industry produced 31,500 power looms. 58/ Because output in the period 1951-53 was 18,500 power looms, output in 1954 must have been at least 13,000 looms.

1955, 1956, and 1957: Estimates of the output of looms in 1955, 1956, and 1957 were made by adding the approximate percentage increases in the loom inventory -- that is, 21, 11, and 6 percent, respectively.

D. Table 4, "Estimates of the Output of Agricultural Equipment in Communist China, 1952-57."

1. New-Type Equipment, 1955-57.

Estimates of Chinese Communist output of new-type agricultural equipment were taken from the sources indicated in Table 4.

2. Old-Type Equipment, 1955-57.

There have been no pronouncements concerning the output of old-type agricultural equipment planned for 1955-57, other than the general statement of an increase in output in 1955 over that in 1954. 59/ The estimates given for 1955-56 are in accord with the general development of the Chinese Communist agricultural equipment industry as shown by the growth in the production of new-type equipment. Because these estimates have no precise statistical basis in terms of planned goals, they must be considered as first approximations.

E. Table 5, "Comparison of Industrial Output in Communist China, 1952-57."

1953: The total value of industrial output in Communist China in 1954 was 17 percent higher than that in 1953. 60/

1954: The total value of industrial output in Communist China in 1954 was 53.7 percent higher than that in 1952. 61/

1955: The total value of industrial output in Communist China in 1955 was expected to be 62 percent higher than that in 1952. 62/

1956: The total value of industrial output in Communist China in 1956 is the arithmetic average of 162 and 198.

1957: The Chinese Communists claim that the aggregate gross value of industrial output in 1952 was 27.01 billion yuan and that in 1957 it will reach 53.56 billion yuan, an increase of 198.3 percent. 63/

Index numbers for machine tools, textile machinery, and new-type agricultural equipment were derived from the output figures in Tables 2, 3, and 4.*

F. Table 6, "Availability of Spindles for Export by Communist China, 1951-57."

This table was derived from the information in Table 3** and in Table 9.***

G. Table 7, "Availability of Looms for Export by Communist China, 1951-57."

This table was derived from the information in Table 3** and in Table 9.***

H. Table 8, "Estimates of the Inventory of Machine Tools in Communist China, 1949-55."

The methodology used to compile Table 8 is described in IV, A, above.

I. Table 9, "Estimates of the Inventory of Textile Machinery in Place in China, 1930, 1937-41, 1945, and 1949-57."

1. Inventory of Spindles.

1930: The figure was given as an absolute figure. 64/

1937: The figure was given as an absolute figure. 65/

1950: The figure was given as an absolute figure.

1951: The Chinese Communists stated that the textile plan for 1951 was to increase the number of spindles by 162,000, 66/ and it is assumed that the plan was fulfilled.

* Pp. 5, 7, and 9, respectively, above.
** P. 7, above.
*** P. 24, above.

1952: The figure was given as an absolute figure. 67/

1953-57: By the end of 1957 the number of spindles in place is to be 1,650,000 above the number in 1952, 68/ or a total inventory of 7,310,000 spindles. The announcements by the official Chinese Communist press and radio about the progress made in construction reveals that expanded or planned plants accounted for 1,533,000 of the 1,650,000 spindles. By assuming a capacity for spindle production for plants on which data were lacking, the total figure was brought to 1,650,000, and the series for 1953-57 was obtained by adding up figures on plant output according to the date on which the plants went into operation.

Reports on individual plants indicate that the additions for spindle production capacity for the First Five Year Plan are as follows: 1953, 221,000; 1954, 529,000; 1955, 471,000; 1956, 250,000; and 1957, 179,000. 69/ Other data are consistent with this pattern of increase. First, in one announcement, 70/ the figure for 1953 was given as 14.52 percent above that for 1949, or 5,891,000, which is to be compared with 5,881,000 obtained by totaling plant announcements. Second, the figure for 1954 is given in the Li Fu-ch'un report as 7 million, which is to be compared with 6,410,000 obtained by the plant announcement method. Third, the decline in the rate of growth in 1956 and 1957 fits in with the announcement that the original expansion plans for the 5-year period were but by 800,000 spindles. 71/ (Such a cut would have more effect in the later years because it is to be expected that plants being constructed would be completed but fewer new ones would be started.)

2. Inventory of Looms.

1930: The figure of 29,582 was given as an absolute figure. 72/

1937: The figure of 58,439 was given as an absolute figure. 73/

1949: The figure of 68,155 was given as an absolute figure. 74/

1950: It was estimated that the additions to the number of looms in 1950 were small, perhaps 1,000 looms, because industrial expansion plans under the Chinese Communists had had little time to go into effect. The estimate of 1,000 looms was made by assuming a figure equal to one-half of the 2,000 looms which were to be added to capacity in 1951.

1951: The textile plan for 1951 called for an increase in the number of spindles of 162,000 and for the manufacture of 2,000 power looms. 75/ Because the figures on spindles given in this statement refer to additions of spindles to capacity and because other sources give loom output as 4,000 in 1951, it is reasonable to assume that the "2,000 machine looms" in the quotation refer to additions to inventory, not to output.

1952: This figure was given as 111 percent of the inventory in 1949. 76/ It should be noted that the figure for 1952 is independent of the estimates made for either 1950 or 1951.

1953-57: The inventory planned for 1957 is given in the First Five Year Plan as 47,100 looms above that in 1952. 77/ The addition of 47,100 looms is believed to be distributed among the 5 years in the same proportion as is the addition of the 1,650,000 spindles which are to be added under the Plan because the Chinese Communists tend to add spindles and looms to their textile mills in fixed proportions.

J. Table 10, "Physical Productivity of Spindles and Looms in Communist China and in India, 1950-54."

1. In Communist China.

Figures for yarn and cloth were taken from official Chinese Communist statistics [redacted] 25X1C

2. In India.

Figures for 1950 to 1953 were derived from a report published by the Ministry of Information and Broadcasting of the Government of India. 79/

Figures for 1954 were obtained from source 80/.

K. Tables 11, 12, and 13, on Geographic Distribution of Production.

Information about the geographic distribution of the production of machine tools,* textile machinery, and agricultural equipment in Communist China has been based on material available on the individual plants. The best way to present geographic distribution would be to base it on the value of output emanating from the various regions. Because this information is not available, the percentages given can be considered only as first approximations.

The estimated shift in relative importance from the coastal regions to the interior should be especially noted.

* The estimate that Northeast China contributes about 45 percent to the total production of machine tools was based on other sources besides plant data. Kao Kang 81/ in 1950 stated that the output of machine tools in Northeast China in 1949 was 497 units. An output figure for 1954 was obtained by using an index number series up to 1953, 82/ and then output was projected to 1954.

APPENDIX C

GAPS IN INTELLIGENCE

Because machinery is a heterogeneous product, the presentation of machinery production and inventory in terms of units can be misleading. The products discussed in this report differ widely in various machine sizes and qualities. At the minimum, the sizes, general characteristics, and production of each type should be known. Prices probably would indicate both qualitative and size differences, but unfortunately, except for a few scattered cases, prices are not available. In addition to data on prices, sizes, and quality of machinery items, information on trade in machinery within the Sino-Soviet Bloc is lacking. Other specific gaps are data on distribution of machine tools to consuming industries, about which little is known, and more reliable estimates on the machine tool inventory, a first approximation of which was attempted in this report.

The problem of finding a benchmark with which to compare the capital equipment sector of Chinese Communist industry has been particularly frustrating. For example, an adequate notion of Chinese gross national product (GNP) is lacking. In fact, because the Chinese do not have a market-oriented economy, it is extremely doubtful whether the GNP concepts and conventions, originally designed for such industrialized economies as the US and the UK, are appropriate for Communist China. Perhaps labor force estimates with adjustments for possible differences in productivity would be better, except that these, together with wages, also represent gaps in the knowledge of the area.

APPENDIX D

SOURCE REFERENCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this report. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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